

REMARKS

Reconsideration of the present Application in view of the above Amendments and following remarks is respectfully requested. Claims 1-59 were pending. As set forth above, Applicants have cancelled claims 1-5, 8-22, 29-51, and 53-59 without acquiescence to any rejection and without prejudice to further prosecution of this subject matter in any divisional, continuation, or continuation-in-part application. Claims 6-7, 23, and 52 have been amended and new claims 60-74 have been added to define more clearly the subject matter encompassed by the Applicants' invention. Support for the amended and new claims may be found in the Application as originally filed (*see, e.g.*, page 9, line 18 through page 10, line 24; page 10, lines 4-7; page 12, line 27 through page 13, line 6; page 14, lines 24-26; page 15, lines 9-24; page 16, lines 15-28; page 17, lines 12-23; page 26, line 29 through page 27, line 5; page 29, lines 4-14, 15-19; page 30, line 27 through page 31, line 11; page 37, line 15 through page 38, line 28; Figure 9) and in the enclosed Sequence Listing. No new matter has been added. Therefore, in view of the Amendments submitted herewith, claims 6, 7, 23-28, 52, and 60-74 are pending.

Applicants have amended the Sequence Listing to correct several typographical errors in the polypeptide sequences, SEQ ID NO:2 (EPEC (enteropathogenic *E. coli*) Tir polypeptide); SEQ ID NO:4 (EHEC (enterohemorrhagic *E. coli*) Tir polypeptide); and SEQ ID NO:6 (RDEC-1 Tir polypeptide). Accordingly, the corrected polypeptide sequences, SEQ ID NO:10 (EPEC Tir polypeptide); SEQ ID NO:11 (EHEC Tir polypeptide); and SEQ ID NO:12 (RDEC-1 Tir polypeptide) have been added to the enclosed Sequence Listing. These polypeptide sequences (SEQ ID NOS:10-12) are disclosed in Figure 9 in the application as originally filed and, therefore, do not constitute new matter. Furthermore, the polypeptide sequences set forth in SEQ ID NOS:10, 11, and 12 are the deduced amino acid sequences encoded by the originally disclosed nucleotide sequences, SEQ ID NOS: 1, 3, and 5, respectively. Accordingly, the specification has been amended to provide the correct sequence identifiers of the Tir polypeptides (SEQ ID NOS:10-12) encoded by the polynucleotide sequences set forth in SEQ ID NOS:1, 3, and 5, respectively. The Sequence Listing also has been amended to add SEQ ID NO:13, which is a peptide fragment shown in Figure 6A and which is required under 37 CFR § 1.821(c) to have an assigned sequence identifier. Applicants

respectfully submit that the present application is now in conformance with 37 CFR §§ 1.821-1.823 and WIPO Standard 25.

OBJECTIONS TO THE DRAWINGS

The drawings stand objected to under 37 C.F.R. § 1.84. Specifically, the Draftsperson asserts that (i) Figures 1A-6A, 7A, 7B-8B are of poor quality (half-tone) and do not meet the requirements for photographs under 37 C.F.R. § 1.84(b); (ii) the top and left margins of Figures 1A, 2B, 4-6A, and 8B do not meet the size requirements under C.F.R. § 1.84(g); Figure 4 has a poor figure legend and Figure 6A displays improper height of numbers, letters, and reference characters, thus failing to satisfy C.F.R. § 1.84(p).

Applicants respectfully submit that formal drawings (Figures 1-9) submitted herewith obviate the basis for this objection. Applicants note that the informal drawing of Figure 6 had two views, whereas the formal drawing of Figure 6 has three views (FIG. 6A, B, and C). References to Figure 6 in the specification have been amended accordingly. Applicants therefore respectfully submit that the drawings meet all requirements under 37 C.F.R. § 1.84 and request that the objection be withdrawn.

OBJECTION TO THE SPECIFICATION

The specification is objected to for lack of formality. More specifically, the U.S. Patent and Trademark Office (PTO) asserts that Applicants should apply the correct use of trademarks in the specification.

Applicants respectfully submit that the basis for this objection has been obviated by the Amendments to the specification submitted herewith. Applicants have amended the specification to apply the use of trademarks at paragraphs beginning on page 5, line 19; page 38, line 5; page 39, line 6; page 39, line 17; page 40, line 10; page 46, line 6; page 47, line 21; and page 49, line 23. In addition, a typographical error has been corrected in the paragraph beginning on page 40, line 6. Accordingly, Applicants respectfully submit that the Application meets the formality requirements.

REJECTION UNDER 35 U.S.C. § 112, FIRST PARAGRAPH (WRITTEN DESCRIPTION)

In this Office Action dated February 11, 2004, claims 1-5 and 52-59 were rejected under 35 U.S.C. § 112, first paragraph, for lack of written description. More specifically, the PTO asserts that the specification discloses Tir polypeptide amino acid sequences (SEQ ID NO:2 and SEQ ID NO:4) from one strain of EPEC or EHEC, respectively, and that allegedly a person skilled in the art would not recognize from the disclosure that Applicants were in possession of a genus of Tir polypeptides.

Applicants respectfully traverse this ground of rejection and submit that Applicants possessed the claimed invention, as disclosed in the present specification and recited in the instant claims, at the time the Application was filed. Applicants submit that in view of the Amendments submitted herewith, which include cancellation of claims 1-5 and 53-59 without acquiescence or prejudice, the rejection of these claims has been rendered moot.

With respect to claim 52, as conceded by the PTO, the specification describes a Tir polypeptide comprising the amino acid sequence of either SEQ ID NO:10 (corrected EPEC Tir polypeptide sequence) or SEQ ID NO:11 (corrected EHEC Tir polypeptide sequence) (*see, e.g.*, page 14, lines 24-26; *see generally*, page 8, line 8 through page 17, line 23; Figure 9; Sequence Listing). The specification also describes a pharmaceutical composition that comprises such a Tir polypeptide (*see, e.g.*, page 24, lines 15-20). Applicants therefore submit that a skilled artisan would readily recognize that Applicants possessed the claimed composition at the time the Application was filed.

Accordingly, Applicants respectfully submit that the Application meets the written description requirements under 35 U.S.C. § 112, first paragraph, and request that this rejection be withdrawn.

REJECTION UNDER 35 U.S.C. § 112, FIRST PARAGRAPH (ENABLEMENT)

In the Office Action, claims 1-5 and 52-59 were rejected under 35 U.S.C. §112, first paragraph, for lack of enablement. The PTO concedes that the specification is enabling for a substantially purified EPEC or a EHEC Tir polypeptide having the amino acid sequence SEQ ID NO: 2 or SEQ ID NO: 4, respectively, and for pharmaceutical compositions comprising same;

however, the PTO asserts that the specification does not reasonably provide enablement for a substantially purified generic Tir polypeptide of any origin, size, or structure that is "suitable for treating a pathogenic infection."

Applicants respectfully traverse this ground of rejection and submit that as disclosed in the present specification and recited in the instant claims, Applicants fully enabled the claimed invention at the time the Application was filed. In view of the Amendments submitted herewith, which include cancellation of claims 1-5 and 53-59 without acquiescence to any rejection and without prejudice to further prosecution of this subject matter in a related application, Applicants submit that the rejection of these claims is rendered moot.

Applicants respectfully submit that the specification provides guidance enabling a skilled artisan to make and use the claimed polypeptides, readily and without undue experimentation. Amended claim 52 is directed in pertinent part to a pharmaceutical composition comprising a polypeptide that comprises at least one of the amino acid sequences set forth in SEQ ID NO:10 or SEQ ID NO:11. As conceded by the PTO, the specification enables a skilled artisan to make and use a polypeptide comprising the amino acid sequence of SEQ ID NO:10 (corrected EPEC Tir polypeptide sequence) or SEQ ID NO:11 (corrected EHEC Tir polypeptide sequence), according to methods taught in the specification and known in the art (*see, e.g.*, page 14, line 24 through page 17, line 23), and to make and use a pharmaceutical composition comprising such a polypeptide (*see, e.g.*, page 24, lines 15-20; page 29, line 4 through page 30, line 11).

The specification enables use of pharmaceutical compositions comprising a Tir polypeptide for immunizing cattle using standard protocols that are well known to persons skilled in the veterinary art (*see, e.g.*, page 30, lines 1-11; page 51, lines 8-21). Furthermore, only permissive routine experimentation would be required to determine whether the immune response induced in the cattle by the Tir polypeptide blocks adherence of Tir-producing *E. coli* to tissues (*see, e.g., id.*). Applicants thus submit that the specification provides objective enablement as required under 35 U.S.C. § 112, first paragraph (*see In re Marzocchi*, 169 U.S.P.Q. 367, 369 (C.C.P.A. 1971) (A specification that teaches the manner and process of making and using the invention in terms that correspond in scope to the claimed subject matter

must be taken as in compliance with the enablement requirement unless a reason exists to doubt the objective truth of the statements relied on for enabling support.).

Applicants, therefore, respectfully submit that the Application satisfies all requirements of 35 U.S.C. § 112, first paragraph, and request that the rejection be withdrawn.

REJECTION UNDER 35 U.S.C. § 112, FIRST PARAGRAPH (NEW MATTER)

In this Office Action, claims 53-59 were rejected under 35 U.S.C. § 112, first paragraph, as containing new matter. Applicants respectfully submit that the rejection of claims 53-59 has been rendered moot by cancellation of these claims according to the Amendment submitted herewith. Accordingly, Applicants request that this rejection be withdrawn.

REJECTIONS UNDER 35 U.S.C. §112, SECOND PARAGRAPH

In the Office Action, claims 3-7 and 52-59 were rejected under 35 U.S.C. §112, second paragraph, for indefiniteness. The PTO asserts that claim 3 is vague and that the nature of “pathogen,” whether it is viral, parasitic, fungal, or bacterial, is not clear. Claim 59 is also allegedly vague regarding the precise nature of the “pathogenic infection,” in particular, whether the pathogenic infection is viral, parasitic, fungal, or bacterial. Claims 4-7 and 53-59 that depend from rejected base claims 3 and 52, respectively, are also rejected for indefiniteness. The PTO suggests that the phrase “an amino acid sequence” be replaced by “the amino acid sequence,” and also suggests that the phrase “a polypeptide of claim 1” be replaced with “the polypeptide of claim 1.”

Applicants respectfully traverse these grounds of rejection and submit that the present claims clearly point out and distinctly claim what Applicants regard as their invention. In view of the Amendments submitted herewith, which include cancellation of claims 3-5 and 53-59, Applicants submit that the rejection of these claims has been rendered moot.

Applicants have incorporated the Examiner’s suggested language in amended claims 6 and 7, which are directed to an isolated polypeptide comprising “the amino acid sequence” as set forth in SEQ ID NO:10 (corrected EPEC Tir polypeptide sequence) or SEQ ID

NO:11 (corrected EHEC Tir polypeptide sequence), respectively. Applicants respectfully submit that the basis for the rejection of claim 52 has been obviated by the amendments to the claim. Amended claim 52 is directed to a pharmaceutical composition comprising a polypeptide that comprises “the amino acid sequence” set forth in SEQ ID NO:10 or SEQ ID NO:11 in a pharmaceutically acceptable carrier.

Accordingly, Applicants respectfully submit that all claims meet the requirements for definiteness under 35 U.S.C. §112, second paragraph, and respectfully request that this rejection be withdrawn.

REJECTION UNDER 35 U.S.C. § 102(b)

In the Office Action, claims 1, 3-5, 52, 53, 55, 57, and 59 were rejected under 35 U.S.C. § 102(b) as anticipated by Rosenshine et al. (*EMBO J.* 15:2613-2624, 1996) as evidenced by Kenny et al. (*Cell* 91:511-520, 1997). In particular, the PTO alleges that Rosenshine et al. disclose the Hp90 protein, which associates directly with the EPEC adhesin, intimin. The PTO asserts that the disclosure of Rosenshine et al. inherently teaches that the prior art Hp90 protein is the same as the claimed EPEC-secreted bacterial protein Tir, particularly in light of Kenny et al., who teach that Hp90 or Tir is an EPEC secreted protein.

Applicants respectfully traverse this ground of rejection and submit that Rosenshine et al. fail to anticipate each limitation of the present claims. Applicants submit that the rejection of claims 1, 3-5, 53, 55, 57, and 59 is rendered moot by the Amendments submitted herewith that include cancellation of these claims without acquiescence or prejudice.

Applicants submit that the cited document fails to anticipate each and every limitation of claim 52, which is directed, in pertinent part, to a pharmaceutical composition comprising a polypeptide that comprises the amino acid sequence set forth in SEQ ID NO:10 (corrected EPEC Tir polypeptide sequence) or SEQ ID NO:11 (corrected EHEC Tir polypeptide sequence). Rosenshine et al. fail to teach or suggest an isolated Tir polypeptide comprising the amino acid sequence of SEQ ID NO:10 or 11. Furthermore, the cited document does not teach or suggest *any* polypeptide sequence and also fails to teach any polynucleotide sequence from

which a polypeptide sequence could be deduced. Therefore, Rosenshine et al. fail to teach or suggest all limitations of the present claims.

Accordingly, Applicants respectfully submit that the present invention satisfies the requirements for novelty under 35 U.S.C. § 102, and request that this rejection be withdrawn.

REJECTIONS UNDER 35 U.S.C. § 103(a)

In the Office Action, claims 52-54, 56, and 58 were rejected under 35 U.S.C. §103(a) as obvious over Rosenshine *et al.* (*EMBO J.* 15:2613-24, 1996). Allegedly, formulation of an art-known polypeptide in a liposome, tablet, capsule, or with a sterile buffered carrier is routine and conventional in the art. Thus, the PTO asserts that it would have been obvious for a person having ordinary skill in the art to formulate the known Hp90 protein to produce a composition as claimed with a reasonable expectation of success.

Applicants respectfully traverse this rejection and submit that the document cited by the PTO fails to teach or suggest the subject matter of the instant claims. With respect to claims 53, 54, 56, and 58, Applicants submit that the rejection has been rendered moot because these claims have been hereby cancelled. As discussed above, Rosenshine et al. fail to teach or suggest each and every limitation of claim 52, which is directed, in pertinent part, to a pharmaceutical composition comprising a polypeptide having the sequence of SEQ ID NO:10 or SEQ ID NO:11. Therefore, Applicants respectfully submit that a *prima facie* case of obviousness has not been established because Rosenshine et al. alone or in combination with any other prior art document, fail to teach or suggest each and every limitation of the present claims.

Accordingly, Applicants respectfully submit that the present invention is nonobvious and satisfies the requirements of 35 U.S.C. § 103. Therefore, Applicants request that this rejection be withdrawn.

Applicants respectfully submit that all pending claims in the Application are allowable. Favorable consideration and a Notice of Allowance are earnestly solicited. The

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Examiner is urged to contact the undersigned attorney to address any questions prior to allowance of this matter.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC



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Enclosed:

Petition for Extension of Time
Sequence Listing
CRF of Sequence Listing
Declaration regarding Sequence Listing
13 Sheets of Replacement Formal Drawings (Figures 1A-9B)

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